FLUX

ALGORITHMS
DESCRIPTION

CONTENTS

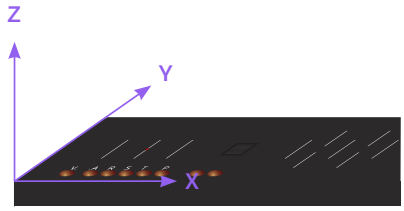
GENERAL NOTES 3
ALGORITHMS DESCRIPTION 4
C1 → VOX 4
C1# → PIPE 5
D1 → DETUNE 6
D1# → 3 POLES 1 7
E1 → DETUNED SAWS 8
F1 → BYTEBEAT 1 9
F1# → BYTEBEAT 1 TEMPO 10
G1 → TREMOLO 1 11
G1# → TREMOLO 1 TEMPO 12
A1 → TREMOLO 2 13
A1# → TREMOLO 2 TEMPO 14
B1 → BELL 15
C2 → 3D 1 16
C2# → 3D 2 17
D2 → 8 BIT 18
D2# → SYNC RESONANCES 19
E2 → 3D 3 20
F2 → 3D 4 21
F2# → CLAVIER 22
G2 → DIGITAL CHAOS 23
G2# → DELAYED PITCH 24
A2 → SOLO 1 25
A2# → SOLO VOICE 26
B2 → X PLECTRUM 27
C3 → CHORDS 28
C3# → DISSONANT HARMONIX 29
D3 → RING MODULATION 30
D3# → BASS1 31
E3 → PAN 32
F3 → DUO 33
F3# → WAVETABLE 34
G3 → SIX POLES 35

GENERAL NOTES

In this document you will find descriptions of all current FLUX synthesis algorithms as well as their timbral functions. Below each algorithm name you will find a note to which the algorithm is attached when you select it using the **A** sensor and the note keyboard as a big dial-slider, along with the algorithm's pictogram.

We use guitar-style note names since it is more compact. As FLUX has 3 full octaves plus Do(C) of the fourth octave, we add numbers to the note names to indicate in which octave each note (algorithm) is.

When the timbral controller or its part is organized as two- or three-dimensional space, we use the following axis placement and marking:



With FLUX in polyphonic mode, most algorithms have two modes for the timbral keyboard:
Individual mode: states of the timbral keyboard hold individually for each voice (hereafter "timbral keyboard individual").
Common mode: the timbral keyboard is common for all voices (hereafter "timbral keyboard common").
You can hear the difference between the modes if you play different notes with long release, changing timbral bow position. With individual timbral keyboard states, bow movement will affect only the current note/voice. With common timbral keyboard, bow movement will also affect the notes/voices that are on release.

Each algorithm is a complete instrument that requires some mastering before you can play it artistically and intuitively, especially the timbral keyboard.

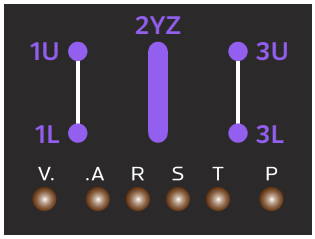
The algorithms in FLUX and in the description are in the sequence in which they were created.

ALGORITHMS DESCRIPTION

VOX
C1

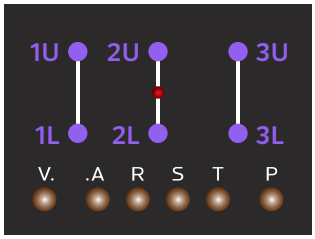
Sounds built around Theremin and classical vocal timbres. Smooth, mellow, melodious, but also with a possibility to enter into the area of noise and distortion.

Timbral keyboard
Normal bow



1L (lower) — sharp timbre 1, **1U** (upper) — adds octave up,
2Y (Y-axis movement) — formant filter frequency, **2Z** (Z-axis movement) — formant filter amount,
3L — sharp timbre 2, **3U** — soft singing harmonics.

Timbral keyboard
Flipped bow



1L — sharp timbre 3 with octave down, **1U** — adds octave up (brighter version),
2L— FX out as FM operator, **2U** — FX out as FM operator + soft singing harmonics,
3L — distortion after FX, **3U** — distortion after FX + soft singing harmonics.

Left tilt — adds whistle-like noise, **Right tilt** — adds noise pitch modulation.

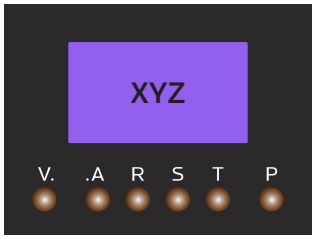
Variations:
A — normal mode. **B** — switches on high pass filter that cuts low frequency rumble that happens when deep modulation "FX out as FM operator" is applied.

Maximum polyphony — 9

PIPE
C1#

A physical modelling of a wind pipe with high pass and low pass filters in a feedback loop that defines on what harmonics the pipe resonates.

Timbral keyboard



Normal bow
X — high pass filter frequency.
Y — low pass filter frequency.
Z — feedback depth.*

Flipped bow
The same as normal bow but with waveshaper added in the feedback loop (more harsh sound).

Left tilt — negative total feedback, **Right tilt** — positive total feedback.

Variations:
A — normal mode. **B** — adds additional resonance that generates soft oscillation before the pipe goes into a self-oscillating state.

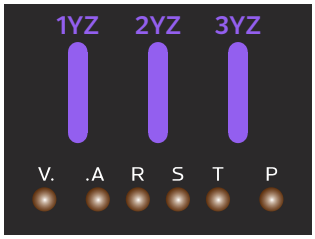
Maximum polyphony — 12

* The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard. You need to bring the bow to the timbral controller for the pipe to start to resonate.

DETUNE
D1

A set of sounds built on the basis of detuned oscillators that create pulsations, the faster they are, the more detuned they become.

Timbral keyboard



Normal bow
1Y — detune of octave down oscillators, **1Z** — amount of octave down oscillators *.
2Y — detune of the main octave oscillators, **2Z** — amount of the main octave oscillators *.
3Y — detune of octave up oscillators, **3Z** — amount of octave up oscillators *.

Flipped bow
The same as normal bow but with waveshaper added.

Left tilt — add FX mix and decrease FX time, **Right tilt** — add FX mix and increase FX time.

Variations:
A, B, C, D — different oscillator wavetables, timbral keyboard individual.
E, F, G, H — the same oscillator wavetables, timbral keyboard common.

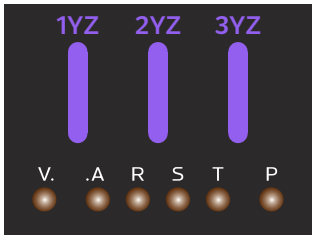
Maximum polyphony — 9

* The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard.

3 POLES 1
D1#

The synthesis is based on three synthesis poles: FM harmonics, band pass filter and detuned saws.

Timbral keyboard



Normal bow
1YZ — FM harmonics.
2Y — BPF frequency, **2Z** — BPF amount.
3Y — saws detune, **3Z** — saws amount.

Flipped bow
Timbre variations for the three poles.

Left and right tilt — add FX out as FM operator (left — negative, right — positive).

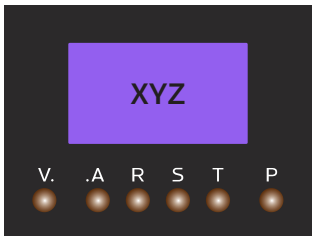
Variations:
A — normal, **B** — the BPF becomes a part of FM. Both A and B — timbral keyboard individual.
C — normal, **D** — the BPF becomes a part of FM. Both C and D — timbral keyboard common.

Maximum polyphony — 7

DETUNED SAWS
E1

A cluster of triangle-saw oscillators with detune and filter.

Timbral keyboard



Normal bow
X — low pass filter frequency.
Y — detune + wide panning.
Z — triangle to saw transition + low pass filter resonance.

Flipped bow
Switches the filter mode to band pass filter.

Left and right tilt — pitch noise modulation.

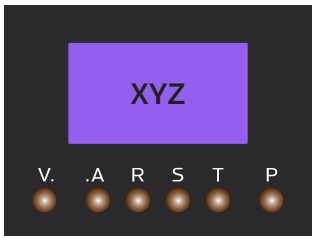
Variations:
A — timbral keyboard individual.
B — timbral keyboard common.

Maximum polyphony — 5

BYTEBEAT 1
F1

An algorithm based on ByteBeat rhythm and timbre synthesis.

Timbral keyboard



Normal bow
X — ByteBeat formulas.
Y — ByteBeat speed.
Z — brightness.

Flipped bow
Changes the set of ByteBeat formulas.

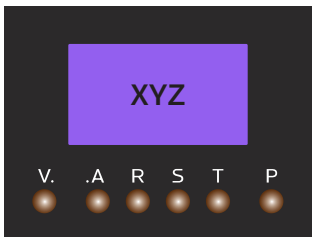
Left and right tilt — noise modulation.

Variations:
A, B, C, D — different oscillator wavetables, timbral keyboard individual.
E, F, G, H — the same oscillator wavetables, timbral keyboard common.
.
Maximum polyphony — 12

BYTEBEAT 1 TEMPO
F1#

An algorithm based on ByteBeat rhythm and timbre synthesis with a possibility to define exact tempo for ByteBeat rhythmic pulsations. Identical to the previous one but with the tempo function. The tempo is attached to delay time which puts them in perfect sync. For setting up the tempo adjust the delay time or holding **S** (SPATIAL) tap **P**. In this algorithm, the tap function works at any time even when you play on the note keyboard or the timbral keyboard is blocked. The tempo is indicated by a flashing dot on the display..

Timbral keyboard



Normal bow
X — ByteBeat formula.
Y — ByteBeat speed.
Z — brightness.

Flipped bow
Changes the set of ByteBeat formulas.

Left and right tilt — noise modulation.

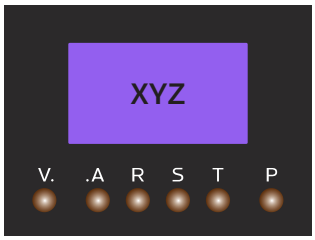
Variations:
A, B, C, D — different oscillator wavetables, timbral keyboard individual.
E, F, G, H — the same oscillator wavetables, timbral keyboard common.

Maximum polyphony — 12

TREMOLO 1
G1

A plucked string sound with a tremolo function that you can control with the left bow.

Timbral keyboard



Normal bow
X — tremolo speed.
Y — mute string.
Z — tremolo intensity.*

Flipped bow
Reversed tremolo envelope.

Left and right tilt — noise modulation.

P — tremolo reset.

Variations:
A, B, C, D — different oscillator wavetables.
E, F, G, H — the same oscillator wavetables + octave down.

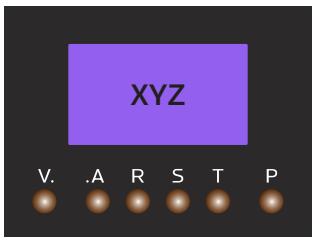
Maximum polyphony — 12

* The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard.

TREMOLO 1 TEMPO
G1#

A plucked string sound with a tremolo function that you can control with the left bow with a possibility to define exact tempo for tremolo. Identical to the previous one but with the tempo function. The tempo is attached to delay time which puts them in perfect sync. For setting up the tempo adjust the delay time or holding **S** (SPATIAL) tap **P**. In this algorithm, the tap function works at any time even when you play on the note keyboard or the timbral keyboard is blocked. The tempo is indicated by a flashing dot on the display.

Timbral keyboard



Normal bow
X — tremolo notes length.
Y — mute string.
Z — tremolo intensity.*

Flipped bow
Switches notes to triplets.

P — tremolo reset.

Left and right tilt — noise modulation.

Variations:
A, B, C, D — different oscillator wavetables.
E, F, G, H — the same oscillator wavetables + octave down.

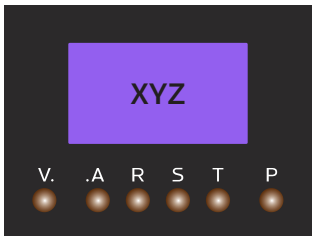
Maximum polyphony — 12

* The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard.

TREMOLO 2
A1

A melodic percussive sound with a tremolo function that you can control with the left bow.

Timbral keyboard



Normal bow
X — tremolo speed.
Y — mute.
Z — tremolo intensity.*

Flipped bow
Reversed tremolo envelope.

P – tremolo reset.

Left and right tilt — add FX mix and increase FX time.

Variations:
A, B, C, D — different oscillator wavetables.

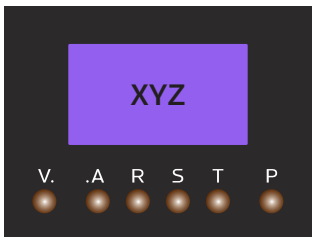
Maximum polyphony — 12

* The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard.

TREMOLO 2 TEMPO
A1#

A melodic percussive sound with a tremolo function that you can control with the left bow with a possibility to define exact tempo for tremolo. Identical to the previous one but with the tempo function. The tempo is attached to delay time which puts them in perfect sync. For setting up the tempo adjust the delay time or holding **S** (SPATIAL) tap **P**. In this algorithm, the tap function works at any time even when you play on the note keyboard or the timbral keyboard is blocked. The tempo is indicated by a flashing dot on the display.

Timbral keyboard



Normal bow
X — tremolo notes length.
Y — mute.
Z — tremolo intensity.*

Flipped bow
Switches notes to triplets.

P — tremolo reset.

Left and right tilt — add FX mix and increase FX time.

Variations:
A, B, C, D — different oscillator wavetables.

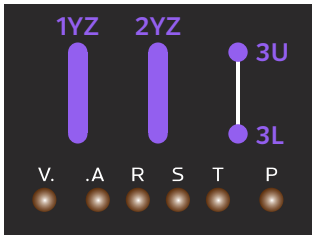
Maximum polyphony — 12

* The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard.

BELL
B1

Different shapes of bell synthesis. It's intended to be used with the main and percussive releases in non-zero states and with Percussive Mode (the right sensor under the display) switched on. But, of course, you can get cool useful sounds with monophonic legato Theremin-like FLUX settings.

Timbral keyboard



Normal bow
1Y — amplitude vibrato speed, **1Z** — amplitude vibrato depth.
2Y — sub oscillator detune, **2Z** — sub oscillator amount.
3L — brightness, **3U** — waveshaper.

Flipped bow
The same like the normal bow set, but with a distortion added. Also, there is no brightness on 3L, just the distortion.

Left and right tilt — LYRA-8 like cross pitch modulation between voices. It sounds bright when the algorithm is in polyphonic mode with long main release.

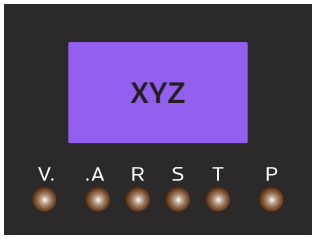
Variations:
A, B, C, D, E, F, G, H — different tune and timbre settings that shape the bell synthesis.

Maximum polyphony — 9

3D 1
C2

A synthesis based on wave-shaping of particular parts of source waveforms with XYZ (three-dimensional) control.

Timbral keyboard



Normal bow
X — harmonics.
Y — sharpness.
Z — harmonics amount.

Flipped bow
The same as normal bow but with octave down added.

Left and right tilt — odd modulations.

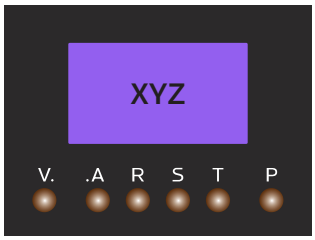
Variations:
A, B, C — timbre variations, timbral keyboard individual.
D — as **B**, but timbral keyboard common.

Maximum polyphony — 12

3D 2
C2#

A crazy synthesis based on all-pass filters with XYZ (three-dimensional) control.

Timbral keyboard



Normal bow
X — all-pass pitch.
Y — all-pass to FM modulation amount.
Z — sharpness.

Flipped bow
The same as normal bow but with octave down added.

Left and right tilt — odd modulations.

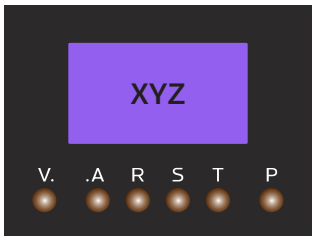
Variations:
A, B, C, D, E, F — different variations of parameters and timbres.

Maximum polyphony — 10

8 BIT
D2

A synthesis based on 8 bit low-fi signal processing.

Timbral keyboard



Normal bow
X — low pass filter frequency.
Y — transition triangle to saw.
Z — low pass filter resonance.

Flipped bow
The same but with changing processing formula.

Left and right tilt — pitch noise modulation.

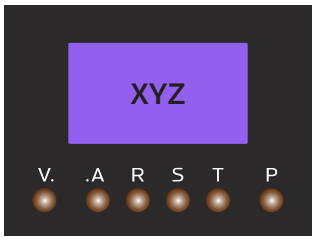
Variations:
A, B — processing variations, timbral keyboard individual.
C, B — the same as **A, B** but timbral keyboard common.

Maximum polyphony — 12

SYNC RESONANCES
D2#

Synced resonances synthesis.

Timbral keyboard



Normal bow
X — resonator tune.
Y — low pass filter frequency.
Z — resonator connection.

Flipped bow
The same but with waveshaper.
Z — resonator connection and low pass filter resonance.

Left and right tilt — total feedback.

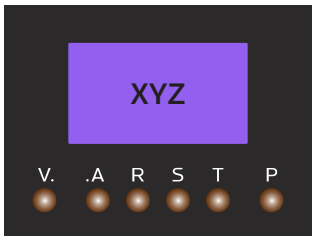
Variations:
A — all possible resonances, timbral keyboard individual.
B — sorted, limited and more controllable resonances, timbral keyboard individual
C — all possible resonances, timbral keyboard common.
D — sorted, limited and more controllable resonances, timbral keyboard common.

Maximum polyphony — 12

3D 3
E2

A synthesis based on triangles and saw waves.

Timbral keyboard



Normal bow
X — sharpness.
Y — saws group amount.
Z — low pass filter frequency.

Flipped bow
The same but with octave down.

Left and right tilt — FX out to oscillators pitch modulation.

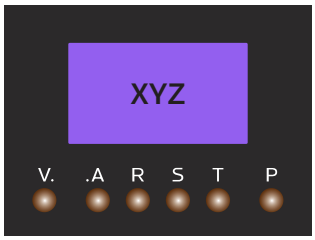
Variations:
A — timbral keyboard individual.
B — timbral keyboard common.

Maximum polyphony — 5

3D 4
F2

Melodic noise sounds.

Timbral keyboard



Normal bow
X — hardness.
Y — oscillation to noise transition.
Z — low pass filter frequency.

Flipped bow
The same but with octave down.

Left and right tilt — FX out to oscillators pitch modulation.

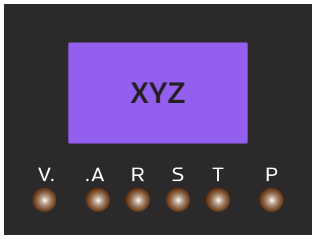
Variations:
A — timbral keyboard individual.
B — timbral keyboard common.

Maximum polyphony — 7

CLAVIER
F2#

Keyboard-like sounds. It's intended to be used with the main and percussive releases in non-zero states and with Percussive Mode (the right sensor under the display) switched on. But, of course, you can get cool useful sounds with monophonic legato Theremin-like FLUX settings.

Timbral keyboard



Normal bow
X — modulation oscillator 1 amount.
Y — modulation oscillator 2 amount.
Z — low pass filter frequency.

Flipped bow
The same but with additional sound brightness.

Left and right tilt — LYRA-8 like pitch cross modulation between voices. It sounds bright when the algorithm is in polyphonic mode with long main release.

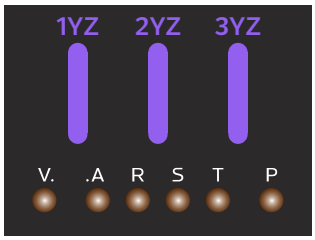
Variations:
A, B, C, D — harmonics variations, timbral keyboard individual.
E, F, G, H — the same harmonics variations as A, B, C, D, but timbral keyboard common.

Maximum polyphony — 11

DIGITAL CHAOS
G2

Blend of digital madness based on ByteBeat principles.

Timbral keyboard



Normal bow
1YZ — the 1st formula.
2YZ — the 2nd formula.
3YZ — the 3d formula.

Flipped bow
The same but with low-fi ring modulation.

Left and right tilt — total feedback after FX.

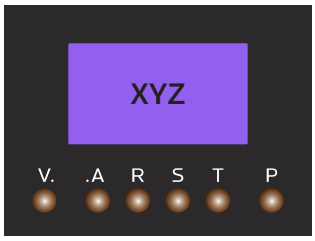
Variations:
A — timbral keyboard individual.
B — timbral keyboard common.

Maximum polyphony — 12

DELAYED PITCH
G2#

The essence of this algorithm is two oscillators where one of them has delay on its pitch. That causes a detune between the oscillators each time when you make a fast enough glissando (change note pitch).

Timbral keyboard



Normal bow
X — triangle to square transition.
Y — triangle to sawtooth transition | square pulse width.
Z — low pass filter frequency.*

Flipped bow
The same but with the low pass filter switched to 12db mode.

Left and right tilt — total feedback after FX.

Variations:
A — timbral keyboard individual.
B — timbral keyboard common.

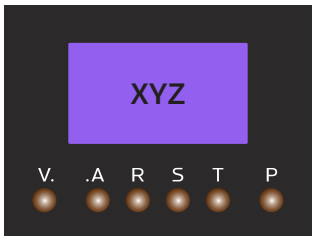
Maximum polyphony — 8

* The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard.

SOLO 1
A2

A lead sound based on phase shifting in wavetables processing.

Timbral keyboard



Normal bow
X — harmonics.
Y — harmonics.
Z — harmonics + volume.*

Flipped bow
Harmonics.

Left and right tilt — total feedback after FX.

Variations:
A, B, C, D — timbral variations, timbral keyboard individual.
E, F, G, H — the same timbral variations as A, B, C, D, but timbral keyboard common.

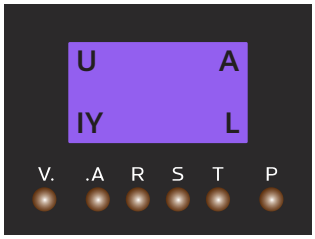
Maximum polyphony — 8

* The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard.

SOLO VOICE
A2#

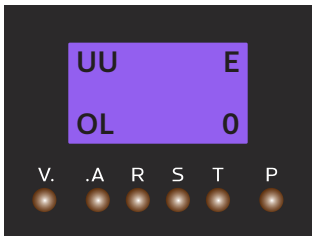
Voice formant synthesis. You can switch formants using the Timbral keyboard.

Timbral keyboard
Normal bow



Z — resonance

Timbral keyboard
Flipped bow



Z — resonance

Left and right tilt — noise.

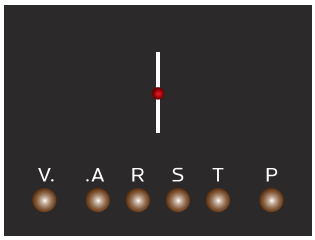
Variations:
A — Feodor
B — Salvador
C — Frank
D — Albert
E — Nikolas
F — Bruno
G — Zita
H — Kiki

Maximum polyphony — 9

In this algorithm, the percussive envelope is switched off and the percussive release doesn't affect sound.

X PLECTRUM
B2

The left (timbral) bow turns into a plectrum that excites a virtual string, when you cross the middle line (the white line with the LED) of the timbral keyboard. X-axis speed of the bow defines the velocity of the triggered notes.



Y — timbre.

Flipped bow
Adds octave down.

Left tilt — noise + FX pitch modulation.
Right tilt — noise pitch modulation.

Variations:
A — normal.
B — moving away the right bow mutes the virtual string.

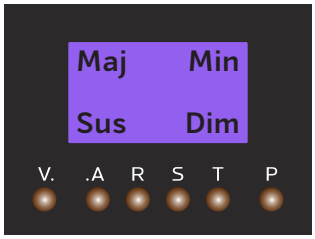
Maximum polyphony — 12

This algorithm requires non-zero common and percussive envelopes. Percussion mode doesn't work and can't be used with this algorithm.

CHORDS
C3

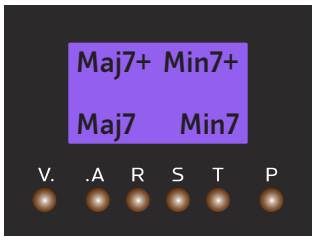
Different chords that you can switch between using the Timbral keyboard.

Timbral keyboard
Normal bow



Z — LPF frequency*

Timbral keyboard
Flipped bow



Z — LPF frequency*

Left and right tilt — pitch bend.

Variations:
A — Normal
B — Chorus

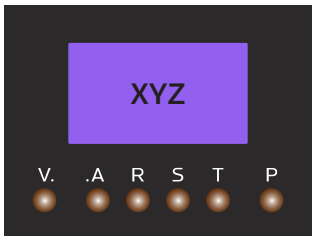
Maximum polyphony — 4 note chord, the root note is defined by the Notes keyboard. You can play just one chord at a time.

* The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard. In this algorithm, the duophonic mode doesn't work.

DISSONANT HARMONIX
C3#

Atonal FM synthesis.

Timbral keyboard



Normal bow
X — Oscillator 1 pitch.
Y — Oscillator 2 pitch.
Z — FM depth.

Flipped bow
Adds FM self-feedback on Z axis.

Left and right tilt — controls total feedback after FX.

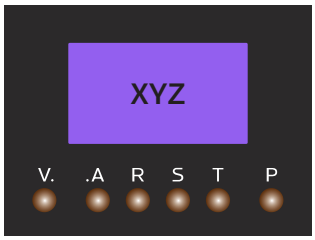
Variations:
A, B, C, D — timbral variations, timbral keyboard individual.
E, F, G, H — the same timbral variations as **A, B, C, D,** but timbral keyboard common.

Maximum polyphony — 12

RING MODULATION
D3

Ring modulation with warping and filtering.

Timbral keyboard



Normal bow
X — Oscillator 1 pitch.
Y — Oscillator 2 pitch.
Z — LPF frequency and ring modulation depth*.

Flipped bow
Adds distortion on Z axis.

Left and right tilt — controls total feedback after FX.

Variations:
A, B, C, D — timbral variations, timbral keyboard individual.
E, F, G, H — the same timbral variations as **A, B, C, D,** but timbral keyboard common.

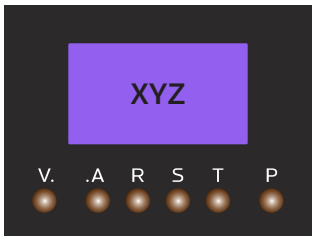
Maximum polyphony — 12

* The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard.

BASS1
D3#

Generally, all FLUX algorithms can create good bass, but this one is designed especially for this purpose and gives the smoothest performance on the low end. The pictogram is a bass clef.

Timbral keyboard



Normal bow
X — Square waveform.
Y — 2nd harmonic.
Z — LPF frequency*.

Flipped bow
X — Sawtooth waveform.
Y — 2nd harmonic.
Z — LPF frequency*.

Left tilt — pitch down until oscillator full stop.
Right tilt — pitch up one octave.

Variations:
A — LPF 6dB.
B — LPF 12dB.

Maximum polyphony — 12

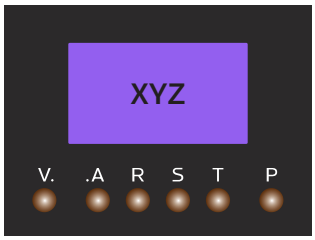
The percussive envelope modulates the LPF frequency.

* The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard.

PAN
E3

A rich timbre that you can pan left and right with X axis movements over the timbral keyboard.

Timbral keyboard



Normal bow
X – Pan.
Y – Timbre.
Z – LPF frequency.

Flipped bow
Adds odd sub harmonics.

Left tilt – vibrato.
Right tilt – detune.

Variations:
A – normal, timbral keyboard individual.
B – with comb filter, timbral keyboard individual
C – normal, timbral keyboard common.
D – with comb filter, timbral keyboard common.

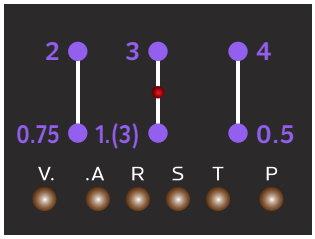
Polyphony – 6

The percussive envelope modulates the LPF frequency.

DUO
F3

An algorithm with a rich orchestral timbre allowing expressive duophonic performance. In duophonic mode, the velocity (Z axis movements on the note keyboard) defines the richness of timbre. As a result, you can get good timbral expression without manipulating the timbral keyboard. Choose the desired timbre on the timbral keyboard, hold it by pressing the HOLD pedal and play duophonic.

Timbral keyboard



Normal bow
It uses all 6 poles of the keyboard. Each sensor controls the amount of its specific harmonic. On the picture above, you can see the number (frequency multiplier) of each harmonic.

Flipped bow
The same but Z proximity adds a hyperbolic wave shaper.

Left and right tilt – controls total feedback after FX.

Variations:
A – timbral keyboard individual.
B – timbral keyboard common.

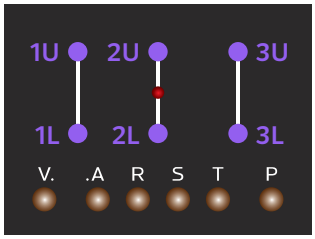
Polyphony – 6

The percussive envelope modulates the FM depth and wave shaper drive.
In the duophonic mode the velocity modulates the FM depth and wave shaper drive.
In all modes, the velocity modulates LPF frequency and sub oscillators waveshape.

WAVETABLE
F3#

A wavetable-based algorithm where each sensor of the timbral keyboard (positive and negative poles) is an individual wavetable. The movements of the bow over timbral sensors defines the mix of wavetables. In this algorithm, it makes sense to try all possible positions of the timbral bow, including different angles, using several bows at the same time, making a snapshot with the HOLD pedal and playing a bow over it. Each position as well as different combinations will create a unique timbre.

Timbral keyboard



Normal bow
A set of 6 wavetables.

Flipped bow
Another set of 6 wavetables.

Left and right tilt – crazy FM modulation of generators by FX output.

Variations:
A – normal, timbral keyboard individual.
B – 3x unison, timbral keyboard individual.
C – normal, timbral keyboard common.
D – 3x unison, timbral keyboard common.

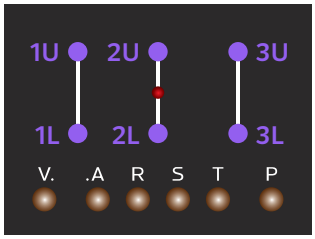
Polyphony – 3

The percussive envelope doesn't work in this algorithm.
The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard.

SIX POLES
G3

An algorithm where each of the six poles of the timbral keyboard is a small individual synth with its own timbre and behavior. The position of the bow defines the balance between them. In this algorithm, it makes sense to try all possible positions of the timbral bow, including different angles, using several bows at the same time, making a snapshot with the HOLD pedal and playing a bow over it. Each position as well as different combinations will create a unique timbre.

Timbral keyboard



Normal bow
A set of 6 timbres.

Flipped bow
Another set of 6 timbres.

Left tilt – flute-like sound.
Right tilt – filtered noise.

Variations:
A – timbral keyboard individual.
B – timbral keyboard common.

Polyphony – 5

The percussive envelope modulates particular parameters of the timbral keyboard.
The algorithm doesn't produce sound if the left bow is far away from the timbral keyboard.

TO BE CONTINUED
WITH FUTURE FIRMWARE UPDATES.

www.somasynths.com
Vlad Kreimer, 2024